SUBJECT INDEX

A

Acetic acid
  DNA denaturation and, 5
Acetylation
  α tubulin and, 706-7
Acetylcholine
  hair cells and, 86
Acetylcholine receptors
  bungarotoxin and, 277
  chemoattractant receptors and, 659
Actin
  cell locomotion and, 666-67
  cuticular plate and, 70
  growth cones and, 48
  oocyte development and, 462-66
  stereocilia and, 68
Actin-binding protein
  chemotaxis and, 667
Actin filaments
  focal adhesion formation and, 491
  nuclear envelope and, 360
α-Actinin
  chemotaxis and, 667
  cuticular plate and, 70
  epithelialization and, 466
  focal adhesions and, 501-2
  growth cones and, 48
Actinomycin D
  mitochondrial protein synthesis and, 159
Action potentials
  growth cones and, 50
Adenosine triphosphate
  hair cells and, 86
  nuclear import of nucleoplasmin and, 348
Adenylyl cyclase
  desensitization of, 408-9
    heterologous, 409-13
    homologous, 413-21
  structure of, 406-8
α-Adrenergic receptors
  phorbol esters and, 422-23
β-Adrenergic receptors
  chemoattractant receptors and, 659
  down regulation of, 414-15
  heterologous desensitization and, 409-13
  homologous desensitization and, 413-21
  phosphorylation of, 415
  receptor-specific kinase and, 415-18
  regulation of, 405-23
  sequestration of, 413-14
Adriamycin
  mitochondrial membrane potential and, 166
Agglutination
  Saccharomyces cerevisiae and, 444-46
Agrobacterium tumerificens
  PhoB regulatory proteins of, 30
Amino acids
  biosynthesis of
    mitochondria and, 290
Aminoglycosides
  hair cell transduction channels and, 72-73
  outer hair cells and, 83
Amniotic membrane
  melanoma cells invading
    blocking of, 112
Amphibians
  ears of
    frequency selectivity of, 78
  papillas of
    organization of, 77
Angiotensin receptors
  desensitization of, 422
Animal cells
  membrane recycling in, 47
Antibiotics
  DNA and, 14-16
  hair cell transduction channels and, 72-73
  outer hair cells and, 83
Anticancer agents
  DNA and, 14
  mitochondrial membrane potential and, 166
α-2-Antiplasmin
  plasmin inhibition and, 103
Antithrombin III
  plasminogen activator inhibitor 2 and, 107
  protease nexin I and, 108
  specificity for heparin and heparan sulfate, 233
Aplysia californica
  segmental ganglia of
    growth cones of, 53
Arabinogalactan proteins, 223-24
Arabinose
  pollen tube walls and, 222
Arachidonic acid
  leukotriene B_4 and, 665
Arrestin
  rhodopsin phosphorylation and, 416, 422
Aspartate
  hair cells and, 86
Aspergillus nidulans
  tubulin genes in, 702
Aspergillus spp.
  mitochondrial genomes of, 299
Astroglial cells
  protease nexin I and, 108
ATP
  See Adenosine triphosphate
Autoimmune disease
  proteoglycans and, 238
Autonomic ganglia
  derivation of, 383
Autonomic nervous system
  constitutive cells of
    origin of, 380-85
Avian leukosis virus
  myristylation and, 625
Axons
  growth cones and, 45, 49
Azide
  mitochondrial membrane potential and, 166

B

Bacillus megaterium
  plasma membrane of
    phosphatidylethanolamine transport across, 502
Bacteria
  gram-negative
    outer membrane of, 22
  left-handed DNA in, 5
Bacteriorhodopsin
  transmembrane domains of, 22
Basal lamina assembly, 200
Basic fibroblast growth factor
  plasminogen activator activity and, 100
  plasminogen activator inhibitor 1 and, 105
Benzo(a)phenoxazinium
  anticancer activity of, 174

Beta vulgaris
self-incompatibility in, 213-14
Birds
basilar papillas of
organization of, 77
ears of
frequency selectivity of, 78
β-tubulin genes in, 690-95
Bovine leukemia virus
myristylation and, 622
Brain
auditory centers of
organization of, 77
Brassica campestris
self-incompatibility in
molecular genetics of, 218
S-gene products of, 217
Brassica oleracea
self-incompatibility in
molecular genetics of, 217-18
S-gene products of, 217
Bungarotoxin
acetylcholine receptors and, 277

C

Calcitonin
plasminogen activator activity and, 100
Calcium channel blockers
mitochondrial membrane potential and, 166-67
Calcium ionophore A23187
growth cone behavior and, 51
Calmodulin
rhodamine 123 and, 173
Camellia japonica
pollen tube walls of, 221-22
Camellia sasanqua
pollen tube walls of, 221-22
Camellia sinensis
pollen tube walls of, 221-22
cAMP
chemotaxis and, 650
focal adhesions and, 505
plasminogen activator gene transcription and, 98
Cancer cells
cisplatin-DNA binding and, 14
mitochondrial membrane potential in, 167-68
plasminogen activator activity in
epidermal growth factor and, 99
platelet-derived growth factor and, 100
plasminogen activator binding sites on, 102
Carbamyl phosphate synthetase I
rhodamine 123 and, 173
Carbohydrate
protein folding and, 278-79
protein transport and, 270-71
Cardiolipin
biosynthesis of, 589-90
phosphatidic acid and, 583
mitochondrial synthesis of, 299
Cartilage
chondroitin sulfate proteoglycans of, 240
type VI collagen and, 565
type IX collagen and, 560-61
type X collagen and, 570-71
Catecholamines
hair cells and, 86
Cell adhesion
chemoattractants and, 656-58
embryonic, 470-71
proteoglycans and, 244-45
Cell differentiation
mitochondrial membrane potential and, 164-65
proteoglycans and, 245-47
Cell growth
mitochondrial membrane potential and, 164
Cell locomotion
activation of, 666-68
chemoattractants and, 656-58
mitochondrial membrane potential and, 165
Cell membrane domains
epithelialization and, 473-76
Cell migration
fibronectin and, 186
plasmin and, 94
plasminogen activation and, 111-13
Cell motility
See Cell locomotion
Chalcogenapyrylium
anticancer activity of, 174
Chemoattractant receptors, 659-63
binding sites of, 662
cyclic nucleotides and, 665-66
desensitization of, 669-72
dissociation of, 663
guanine nucleotide-binding proteins and, 663-64
guanine nucleotides and, 663
phospholipid-induced messengers and, 664-65
Chemoattractants
pathways for, 656
responses induced by, 656-68
biochemistry of, 659-68
physiological, 656-58
Chemokinesis, 658, 669
Chemotaxis
biochemical requirements for, 672
eukaryotic cells and, 649-75
features of, 650-52
hypothetical schemes for, 652-56
working model for, 672-75
Chlamydomonas reinhardtii
mitochondrial DNA of, 297
Chlamydomonas spp.
flagellar morphogenesis in, 706
mitochondrial DNA of, 296
Chloramphenicol
mitochondrial protein synthesis and, 159
Cholera toxin
focal adhesions and, 506
Cholesterol
intracellular transport of, 597-98
Choline phosphotransferase
phosphatidylcholine biosynthesis and, 585
Chondrocytes
differentiation of
proteoglycans and, 245
type VI collagen and, 565
type IX collagen and, 561
type X collagen and, 570-71
Chondroitin sulfate
binding to heparin-binding ligands, 232
proteoglycans and, 233-35
Chromatin
nuclear envelope and, 358-60
transcriptional enhancers and, 142-44
Chromosomes
left-handed DNA in, 5
Circular dichroism
DNA structure and, 3-5
Cisplatin
DNA and, 14
Cochlea
force generators in, 82-83
Collagen, 551-72
cell recognition site of, 244
fibril-forming
structure of, 554
fibrillar networks of
unbanded, 562-71
fibrillogenesis and, 556-59
fibrils of
banded, 552-62
interstitial
assembly of, 200
glycosaminoglycan binding sites of, 232
precursor forms of, 555-56

proteoglycans binding to, 242-43
type IV, 562
type VI, 562-66
type VII, 566-67
type VIII, 567-69
type X, 570-71
type IX, 560-61
type XII, 561-62
Collagenase genes
AP-1 binding sites on, 133
Collagenases
extracellular matrix and, 109
Collagen matrices
cell structuring of, 200
Colony-stimulating factor
plasminogen activator inhibitor 2 and, 107
Colony-stimulating factor type 1
plasminogen activator production and, 101
Commelinaceae
self-incompatibility in, 212
Complement component 5
chemotaxis and, 650
Compositae
self-incompatibility in, 214
Connective tissue
type VI collagen and, 565
Contact inhibition
growth cones and, 55-57
Crithidia fasciculata
RNA editing in, 302
Cruciferae
self-incompatibility in, 214
Cuticular plate
hair cells and, 69-70
Cyclic nucleotides
chemoattractant receptors and, 665-66
Cycloheximide
mitochondrial protein synthesis and, 159
plasminogen activator gene transcription and, 98-99
plasminogen activator inhibitor 1 and, 106
Cyclosporin
rhodamine 123 uptake in lymphocytes and, 166
Cysteine
modified N-terminal, 630-31
Cysteine thioesters, 614-19
Cytidylyltransferase
phosphatidylcholine biosynthesis and, 584
Cytochalasin
chemotaxis and, 667
Cytochalasin D
epithelialization and, 464
Cytochrome *c*
isoforms of, 310
Cytocortex
embryonic development of, 462-69
Cytodifferentiation
fibronectin and, 186
Cytokeratin filaments
oocytes and, 468-69
Cytoplasm
nuclear envelope and, 360
Cytoplasmic proteins
focal adhesions and, 500-4
Cytoskeletal proteins
cell locomotion and, 668
Cytoskeleton
embryonic development of, 462-69

D

Daphnia
retinal cartilage of
growth cones of, 53
Daunomycin
DNA and, 14
Decorin
amino acid sequence of, 235, 237
binding of, 242
progerialike syndrome and, 247
Denaturants
plasminogen activator inhibitor 1 and, 106
Dendrites
growth cones and, 45, 49
Dequalinium
mitochondrial electron transport and, 174-75
Dermatan sulfate
binding to heparin-binding ligands, 232
proteoglycans and, 233-35
Descemet's membrane
type VIII collagen and, 569
Dexamethasone
plasminogen activator gene transcription and, 99
plasminogen activator inhibitor 1 and, 105-6
plasminogen activator inhibitor 2 and, 107
Dextran sulfate
binding to ligands, 232-33
Diacylglycerol
biosynthesis of, 582-84
intracellular transport of, 602
Dicotyledons
pollen tube walls of, 221-22
Dictyostelium discoideum
chemoattractant receptors of, 659
chemotaxis in, 650-62
cytochrome *c* isoforms of, 310
Diltiazem
mitochondrial membrane potential and, 166
Dinitrophenol
mitochondrial membrane potential and, 159
DNA, 1-17
antibiotics and, 14-16
base pairs of
unusual, 16
homopolymer (A).(T), 9-14
left-handed, 3-6
discovery of, 2
right-handed, 6-9
DNA polymerase
rhodamine 123 and, 173
DNase I
DNA in solution and, 7
DNA synthesis
rhodamine 123 and, 161
Docking protein
protein translocation and, 262
Dorsal root ganglia
differentiation of
autonomic precursors and, 397-99
neural tube signal and, 396-97
Drosophila melanogaster
axonal pathways in, 58
Drosophila spp.
biological clock protein of
amino acid sequence of, 235
heat shock response in
novobiocin and, 143
salivary glands of
polytene chromosomes in, 359
tubulin genes in, 700-1

E

EGF
See Epidermal growth factor
Elastin assembly, 200-1
Electron microscopy
focal adhesions and, 489
hair-cell synapses and, 85-86
simian virus 40 minichromosomes and, 143
Embryos
cell adhesion in, 470-71
cell-cell interactions in, 469-73
endocytic system of, 476-78
growth cone guidance in, 53-55

Endocytosis
embryonic, 476-78
growth cones and, 46-47
Endolymph
hair-bundle motion and, 81-82
Endoperoxidases
arachidonic acid and, 665
Endoplasmic reticulum
biosynthesis in, 258-60
cholesterol, 597
outer hair cells and, 83
protein export from, 263-81
protein folding and, 273-81
transport signals and, 268-73
rhodamine 123 and, 161
subdomains of, 260-62
Endothelial cells
chemotaxis in, 649-50
focal adhesion formation by, 490
heparan sulfate proteoglycans of, 247
neovascularization and, 112
plasminogen activator binding to, 103-4
protease nexin I and, 108-9
Endothelial cell surface
plasminogen activator and, 97
Endotoxin
plasminogen activator inhibitor I and, 105
protease nexin I and, 108-9
Epidermal growth factor
focal adhesions and, 506-7
plasminogen activator activity and, 99-100
receptor-binding regions in, 95-96
Epithelial cells
focal adhesion formation by, 490
Epithelium
embryonic development of, 460-80
Equine infectious anemia virus
myristylation and, 625
Erythroleukemia cells
rhodamine 123 uptake in, 166
Escherichia coli
envZ mutant strains of, 26-27
envZ structure in, 30-31
lamB:malT regulation in, 37-38
membrane proteins in regulation of gene expression for, 21-38
NtrC regulatory proteins of, 30
ompC regulation in, 23-36
ompF regulation in, 23-36
ompR gene of, 28-30
phoE:phoBR regulation in, 36-37
Escherichia coli RNA polymerase
transcription by
left-handed poly(dG-dC) and, 5
Esterification, 613-22
enzymology of, 619-21
Estrogen
plasminogen activator activity and, 100
Eukaryotes
microtubules in
functions of, 688
mitotic nuclear envelope rearrangements in, 363-66
Eukaryotic cells
assembly of lipids into membranes of, 580
chemotaxis in, 649-75
nuclear envelope of, 336
Exocytosis
growth cones and, 47
Extracellular matrix
focal adhesions and, 494-96
plasminogen activation and, 109-11
proteoglycans of, 240-41
secreted proteases and, 52
Extracellular matrix assembly, 183-201
proteoglycans in, 242-43
Extracellular matrix proteins
focal adhesions and, 512-14
glycosaminoglycan binding sites of, 232

F

Factor XII
kringle-like structures in, 96
Fasciclin I, 58
Fasciclin II, 58
Fasciclin III, 58-59
Fatty acids
cis-unsaturated
rhodamine 123 uptake in lymphocytes and, 166
Fatty acyl amides, 628-29
Fatty acylation, 611-37
dynamics of, 632-33
esterification and, 613-22
function of, 635-37
growth control and, 633-35
Fertilization
biology of, 211
trophectoderm formation and, 460
α-Fetoprotein gene
expression of, 141
Fibrin
plasmin cleavage of, 93
Fibrinogen
cell recognition site of, 244
glycoproteins IIb/IIIa and, 497
Fibroblast growth factor
plasminogen activator activity and, 100
plasminogen activator inhibitor I and, 105
Fibroblasts
cell adhesive receptors of, 185
chemotaxis in, 649-50
chondroitin sulfate proteoglycans of, 240
amino acid sequence of, 235
fibronectin binding to, 196-97
focal adhesion formation by, 490, 504
plasminogen activator binding to, 104
plasminogen activator binding sites on, 102
protease nexin I and, 108-9
v-fos oncogene-transformed
rhodamine 123 uptake in, 168
Fibronectin
binding to fibroblasts, 196-97
cell adhesive receptors for, 184-86
cell recognition site of, 244
cell surface
fibronectin binding, 193-95
fibrils of
supramolecular organization of, 199
fibrin-binding fingers in, 95
focal adhesions and, 494-96
glycoproteins IIb/IIIa and, 497
glycosaminoglycan binding sites of, 232
heparan sulfate and, 235
plasminogen activator binding to, 97, 103
proteoglycans binding to, 242-43
rhodamine 123 and, 161
structure of, 184-86
Fibronectin matrices
biochemical characterization of, 189-90
biological role of, 186-87
cells organizing, 187-89
disulfide cross-linking of, 195-96
Fibronectin matrix assembly, 184-200

aminoterminal domain and, 192
cell adhesive site in, 197-99
fibroblast models of, 190-91
localization of, 192-93
model for, 199-200
receptors in, 195
Filopodia
growth cones and, 44, 49
Fimbrin
cuticular plate and, 70
focal adhesions and, 501-2
Flow cytometry
mitochondria and, 172
Flowering plants
fertilization in, 209-25
biology of, 211
pollination in, 220-24
hermaphroditic, 210
self-incompatibility in
heteromorphic, 212
homomorphic, 212-15
molecular genetics of, 217-20
self-incompatibility of, 211-20
Focal adhesions, 487-515
components of, 491-92, 494-505
formation of, 490-91
growth factors and, 505-7
hormones and, 505-7
morphology and observation of, 488-90
occurrence in vivo, 493-94
organization of, 504-5
tumor promoters and, 507-8
viruses and, 508-12
Folate coenzymes
biosynthesis of
mitochondria and, 290
Follicle-stimulating hormone
focal adhesions and, 506
plasminogen activator secretion and, 113-14
N-Formylmethionyleucylphenylalanine
chemoattractant receptors and, 659-61

G

GABA
hair cells and, 86
Galactose
pollen tube walls and, 222
Galacturonic acid
pollen tube walls and, 222
Gametophytes
self-incompatibility in, 212-14
molecular genetics of, 218-20
Gangliogenesis
cell line segregation during, 391-99
model for, 393-96
Gangliosides
fibronectin matrix assembly and, 195
Gap junctions
epithelialization and, 471-72
Gastrulation
fibronectin and, 186
Gelsolin
chemotaxis and, 667
Gentamicin
hair cell transduction channels and, 72
Gladiolus longiflorum
arabinogalactan proteins of, 223-24
Glial cells
protease inhibitors secreted by, 52
Glucocorticoid response element
glucocorticoid receptor and, 137-38
Glucocorticoids
plasminogen activator gene transcription and, 99
Glucose
pollen tube walls and, 222
Glucose transport
rhodamine 123 and, 161
Glutamate
hair cells and, 86
sn-Glycerol-3-phosphate
acylglycerol synthesis and, 582-83
Glycerophosphorylcholine
transmembrane movement of, 593
Glycine
hair cells and, 86
Glycoproteins
extravascular breakdown of plasmin and, 93-94
nuclear pore complex, 342-43
Glycosaminoglycans, 229-33
Glycosylation
endoplasmic reticulum and, 258-59
Golgi apparatus
rhodamine 123 and, 161
Gonadotropin releasing hormone
plasminogen activator and, 114-15
Gossypol
antispermatogenic effect of, 166
G protein-coupled receptors, 421-23
G protein receptors
chemoattractant receptors and, 659
G proteins
adenylyl cyclase system and, 406-12
chemoattractant receptor desensitization and, 670
Saccharomyces cerevisiae and, 440
Gram-negative bacteria
outer membrane of
structure of, 22
Green algae
mitochondrial DNA of, 298
Growth cones
chemotaxis in, 649-50
composition of, 47-49
guidance in culture, 55-57
guidance in embryos, 53-55
guidance molecules and, 57-59
motility of, 43-59
physiology of, 49-51
proteases and, 51-52
structure of, 44-45
ultrastructure of, 46-47
Growth factors
extracellular matrix binding sites for
proteoglycans and, 247
focal adhesions and, 505-7
glycosaminoglycan binding sites of, 232
plasminogen activator synthesis and, 98
Guanidine
plasminogen activator inhibitor 1 and, 106
Guanine nucleotide binding proteins
chemoattractant receptors and, 663-64
Guanine nucleotide regulatory proteins
adenylyl cyclase system and, 406-12
Guanine nucleotides
chemoattractant receptors and, 663

H

Hair bundles
active motility of, 82
development and repair of, 70-71
mechanical resonance of, 81-82
receptor current in, 72
stimulation of, 64-67
structure of, 67-70

See also Hair cells
Hair cells, 63-87
adaptation by, 76-77
afferent synapses of, 85-86
electrical tuning of, 78-81
frequency selectivity of, 77-85
length changes of, 83-85
mechanical tuning of, 81-85
mechanoelectrical transduction by, 71-77
receptor potentials of, 71-72
structure and stimulation of, 64-71
transduction channels in, 72-73
gating of, 73-76
See also Hair bundles
Heat shock response
novobiocin and, 143
HeLa cells
plasminogen activator gene activity in
blockage of, 99
Helisoma spp.
neuronal growth cones of, 49-51
Heme
mitochondrial synthesis of, 290, 299
Heparan sulfate
binding to heparin-binding ligands, 232
Heparan sulfate proteoglycan
fibronectin matrix assembly and, 195
focal adhesions and, 496
Heparin
binding to ligands, 232
Hepatocytes
plasminogen activator binding to, 104
Herpes simplex virus D glycoprotein
focal adhesions and, 499
Heterokaryons
mitochondrial membrane potential in, 162-64
Hirudo medicinalis
segmental ganglia of
growth cones of, 53
Histiocytoma-derived U-937 cells
plasminogen activator binding sites on, 102
Histocompatibility antigens
type I
fatty acylated protein of, 618-19
type II
invariant chain of, 235
Hormones
focal adhesions and, 505-7
plasminogen activator synthesis and, 98
Human apoliprotein A
kringle-like structures in, 96
Human apolipoprotein B
acylated proteins in, 632
Human T-cell lymphotropic viruses
myristylation and, 622
Hyaluronic acid
proteoglycan core proteins binding to, 233
Hyperoxia
rhodamine 123 uptake in microvascular cells and, 167

I

Imidazole
rhodamine 123 uptake in erythroleukemia cells and, 166
Immune system
chemotaxis in, 649-50
rheumatoid arthritis and, 101
Immunochemistry
proteoglycans and, 238-39
Immunocytochemistry
growth cones and, 48
Immunoglobulin enhancers
organization of, 133-37
Immunoglobulin genes
transcriptional control sequences in, 129
Immunohistochemistry
hair bundles and, 68
Immunosuppressive viruses
myristylation and, 622
Inner cell mass
formation of, 459-62
Inner ear
hair cells of, 63-87
Insect embryos
axonal pathways in, 57-59
Integrin
calcium channels and, 513
extracellular matrix proteins and, 513-14
focal adhesions and, 493, 496-99, 504
Rous sarcoma virus and, 510
subunits of, 186
Intercellular junctions
epithelialization and, 471-73
Intercellular matrix
embryonic, 469-70
Interference reflection microscopy
focal adhesions and, 488-89
β-Interferon gene
induction of, 139
γ-Interferon
plasminogen activator activity and, 100
Interleukin 1
plasminogen activator activity and, 100-1
plasminogen activator inhibitor 1 and, 105
Interleukin 2
AP-1 binding and, 133
Intermediate filaments
focal adhesions and, 504
mitochondria and, 171-72
nuclear envelope and, 360
oocytes and, 468-69
rhodamine 123 and, 161
Intracellular granules
proteoglycans of, 239-40
Invasive growth
plasmin and, 94
Invertebrates
neuronal pathfinding mechanisms of, 53
tubulin gene families in, 700-4
Ionophores
mitochondrial membrane potential and, 159

K

Kinetochore microtubules, 527-46
depolymerization and, 532-34
dynamics in the spindle, 535-42
nucleation and, 531
polymerization and, 534-35
Kinetochores
structure and function of, 542-46
Kinocilia
hair cells and, 64, 66, 69, 75
Klebsiella pneumoniae
VirG regulatory proteins of, 30

L

Lamellipodia
formation of
chemoattractant-induced, 666-67
growth cones and, 44, 49
Laminins
cell recognition site of, 244
embryonic, 470
glycosaminoglycan binding sites of, 232

Lamins
expression of, 356-57
membrane association of, 357-58
oocytes and, 468-69
Leishmania tarentolae
RNA editing in, 302
Lentiviruses
myristylation and, 625
Leukocytes
chemotaxis in, 649-50
intracellular granules of proteoglycans in, 240
See also Polymorphonuclear leukocytes
Leukotriene B_4
arachidonic acid and, 665
chemotaxis and, 650
Liliaceae
self-incompatibility in, 212
Lilium longiflorum
pollen tube walls of, 221-22
S-gene products of, 216
Lipid bilayers
asymmetric
assembly of, 592-96
formation and maintenance of, 595-96
Lipid sorting
intracellular, 591-92
Lipid transport
intracellular, 596-604
Liponucleotides
intracellular transport of, 603
Lipopolysaccharide
bacterial outer membrane and, 22
plasminogen activator inhibitor 2 and, 107
Lipoxygenases
arachidonic acid and, 665
Lotus corniculatus
self-incompatibility in, 214
Lung fibrosis
fibronectin and, 187
Luteinizing hormone
adenylyl cyclase activity and, 415
plasminogen activator secretion and, 113-14
Lycopersicon peruvianum
S-gene products of, 216
Lymphocytes
proteoglycans of, 240
rhodamine 123 uptake in, 166
Lysophosphatidic acid
acylation to phosphatidic acid, 583
Lysophospholipids
intracellular transport of, 603

M

Macrophages
chemotaxis in, 650
protease nexin I and, 108-9
Maltodextrins
LamB and, 22
Mammals
basilar membranes of
tuning of, 77
β-tubulin genes in, 690-95
Melanoma cells
invasion of
blocking of, 112
Membrane phospholipids
biosynthesis of, 581-90
Membrane potentials
mitochondrial, 155-77
cancer cells and, 167-68
effects of agents on, 165-67
exploitation of, 168-75
monitoring, 161-65
rhodamine 123 and, 157-61
Membrane proteins
Escherichia coli
regulation of, 21-38
fatty acylation of, 259
focal adhesions and, 496-500
Membrane recycling
animal cells and, 47
Mersalyl
B16 melanoma cells and, 112
Metallothionein genes
AP-1 binding sites on, 133
heavy metal responsive elements of, 137-38
Methylglyoxal guanylhydrazone
mitochondrial membrane potential and, 166
Microfilaments
rhodamine 123 and, 161
Microtubule-associated proteins, 688
oocytes and, 466
Microtubules
chemoattractants and, 674
chemotaxis and, 668
dynamic modification of, 704-9
focal adhesions and, 504
free ends of, 528-29
functions in eukaryotes, 688
growth cones and, 48
mitochondria and, 171
nuclear envelope and, 360
rhodamine 123 and, 161
See also Kinetochore microtubules
Microvascular cells
rhodamine 123 uptake in, 167
Mitochondria, 289-322
biogenesis of
nuclear role in, 305-12
enzyme complexes of
assembly of, 320-21
genetic system of, 291-305
intermediate filaments and, 171-72
membrane potential of, 155-77
cancer cells and, 167-68
effects of agents on, 165-67
exploitation of, 168-75
monitoring, 161-65
rhodamine 123 and, 157-61
microtubules and, 171
phospholipid transport to, 600-1
protein import into, 312-20
RNA import into, 320
Mitochondrial proteins
nuclear-coded
isoforms of, 310
nuclear genes for
control of, 310-11
Mitosis
nuclear envelope and, 363-66
Mitoxanthrone
DNA and, 14
Monensin
sphingolipid transport and, 601
Monoclonal antibodies
acetylated α tubulin and, 706
nuclear pore complex glycoproteins and, 342-43
type VII collagen and, 566-67
type VIII collagen and, 569
Monocotyledons
pollen tube walls of, 221-22
Monocytes
plasminogen activator binding sites on, 102
Morphogenesis
tissue reorganization during
plasmin and, 94
Motor neurons
growth cones of, 53-54
Muscarinic receptors
chemoattractant receptors and, 659
desensitization of, 422
phosphorylation of, 423
Myelin basic protein
structure of, 629-30
Myelin proteolipid apoprotein
amino acid sequence of, 613
Myosin
cell locomotion and, 667-68
chemoattractants and, 674
cuticular plate and, 70

growth cones and, 48
stereocilia and, 68-69
Myristylation
proteins and, 622-28

N

Neovascularization
endothelial cells and, 112
Netropsin
DNA and, 14
Neural crest
derivatives of, 377-78
developmental potentials along neuraxis, 387-89
differentiation of, 375-401
Neural crest cells
commitment of, 389-91
migration of
fibronectin and, 186
Neural ridges
developmental fate of, 378-87
Neurites
growth cones and, 48-49
Neurofilaments
growth cones and, 48
Neuromuscular junctions
postsynaptic region of
focal adhesions and, 494
Neuronal cells
protease nexin I and, 108
Neurons
growth cones of
motility of, 43-59
protease secretion by, 51-52
Neurospora crassa
nuclear gene products of, 309
Neurospora spp.
mitochondrial genomes of, 299
Neurotransmitters
growth cones and, 51
hair cells and, 86
Nicotiana alata
arabinogalactan proteins of, 223-24
pollen tube walls of, 221-22
S-alleles in
diversity of, 220
self-incompatibility in
molecular genetics of, 218-20
S-gene products of, 215-16
Nicotiana spp.
self-incompatibility in, 212
Nifedipine
mitochondrial membrane potential and, 166
Nigericin
mitochondrial membrane potential and, 159
Norepinephrine
receptor phosphorylation and, 423
Novobiocin
heat shock response and, 143
Nuclear envelope, 335-67
chromatin and, 358-60
components of
biosynthesis of, 360-63
dynamics during mitosis, 363-66
interactions with cytoplasmic structures, 360
nuclear lamina of, 353-60
nuclear pore complex of
organization of, 338-43
nucleocytoplasmic transport and, 343-53
rough endoplasmic reticulum and, 260-61
Nuclear genes
mitochondrial mRNA and, 307-10
mitochondrial proteins and, 310-11
mitochondrial signals affecting, 311-12
Saccharomyces cerevisiae
mitochondria and, 305-7
Nuclear lamina, 353-60
membrane association of, 357-58
proteins of, 353-54
structure of, 354-56
Nuclear magnetic resonance
DNA structure and, 3-5
Nuclear pore complex
macromolecular translocation and, 352-53
nucleocytoplasmic transport and, 344-45
organization of, 338-43
Nucleocytoplasmic transport
mechanisms of, 343-53
Nucleoplasmin
nuclear import of
adenosine triphosphate and, 348
Nucleosomes
right-handed DNA in, 5
Nucleotides
biosynthesis of
mitochondria and, 290
Nucleus pulposus
type VI collagen and, 565

O

Oenothera organensis
self-incompatibility in, 212
S-gene products of, 217
Oligomerization
endoplasmic reticulum and, 276-78
Oligomycin
mitochondrial membrane potential and, 166
Onagraceae
self-incompatibility in, 212
Oncogenes
mitochondrial membrane potential and, 168
Oocytes
actin and associated proteins and, 462-66
cell membrane domains in, 474-75
cleavage divisions of, 460-62
intermediate filaments in, 468-69
lamins in, 468-69
microtubule-associated proteins in, 466
plasminogen activator and, 114-15
tubulin synthesis in, 466-68
Oogenesis
trophectoderm formation and, 460
Organ of Corti
hair cells and, 65
Organogenesis
fibronectin and, 186
Ornithine transcarbamylase
rhodamine 123 and, 173
Osteopontin
cell recognition site of, 244
Otolith
hair cells and, 66
Otoplasmic reticulum, 84
Outcrossing
flowering plants and, 209-10
Ovulation
plasminogen activation and, 113-15
Oxidative phosphorylation
mitochondria and, 290
Oxyesters, 613-14

P

Papaver rhoeas
self-incompatibility in, 212
Paperavaceae
self-incompatibility in, 212
Parathyroid hormone
focal adhesions and, 506
Peptide hormones
plasminogen activator synthesis and, 98
Peptides
N-formylated
chemotaxis and, 650

Peripheral nervous system
formation of
cell line segregation during, 391-99
Peroxisomes
phospholipid biosynthesis and, 591
Petunia hybrida
pollen tube walls of, 221-22
S-gene products of, 216
Phenanthroline
endothelial cell migration and, 112
Pheromones
Saccharomyces cerevisiae and, 433-38
Phorbol esters
α-adrenergic receptors and, 422-23
plasminogen activator synthesis and, 98
Phorbol myristate acetate
plasminogen activator gene transcription and, 98-99
plasminogen activator inhibitor 2 and, 107
Phosphatidic acid
biosynthesis of, 582-84
Phosphatidylcholine
biosynthesis of, 584-86
diacylglycerol and, 583
transmembrane movement of, 592-94
Phosphatidylethanolamine
biosynthesis of, 586-87
diacylglycerol and, 583
transmembrane movement of, 592
Phosphatidylglycerol
biosynthesis of, 589-90
phosphatidic acid and, 583
Phosphatidylinositol
biosynthesis of, 589-90
phosphatidic acid and, 583
C-terminal glycosyl, 631-32
plasminogen activator inhibitor 1 and, 106
Phosphatidylserine
biosynthesis of, 587-89
diacylglycerol and, 583
plasminogen activator inhibitor 1 and, 106
Phospholipase C
activation of
receptors coupled to, 422
vinculin mobilization and, 506
Phospholipid flippases, 592-94
Phospholipid-induced messengers
chemoattractant receptors and, 664-65
Phospholipids
assembly of, 579-605
bacterial outer membrane and, 22
biosynthesis of, 581-90
mitochondria and, 290
intracellular transport of, 598-601
plasminogen activator inhibitor 1 and, 106
Phosphorylation
β tubulin and, 709
Phosphotyrosine
vinculin and, 509-10
Physarum spp.
tubulin genes in, 701-2
Pinocytosis
chemoattractants and, 656-58
Plasma membrane
cholesterol transport across, 597-98
focal adhesions and, 492
transmembrane movement across
protein-mediated, 594-96
Plasmids
supercoiled
left-handed DNA and, 5
Plasmin
functions of, 93-94
protease nexin I and, 108
α-2-Plasmin inhibitor
plasmin inactivation and, 94
Plasminogen
kringle-like structures in, 96
Plasminogen activation, 93-116
cell migration and, 111-13
extracellular matrix and, 109-11
ovulation and, 113-15
physiological functions of, 109-15
Plasminogen activator inhibitor 1, 104-6
Plasminogen activator inhibitor 2, 106-8
Plasminogen activator-plasmin system
extracellular matrix and, 109
Plasminogen activators
activity of
localization of, 101-4
focal adhesions and, 508-9
functions of, 52
inhibitors of, 104-9
properties of, 95-98
synthesis of
transcriptional control of, 98-101
Platelet-activating factor
chemotaxis and, 650
Platelet-derived growth factor
focal adhesions and, 506-7
plasminogen activator activity and, 100
Platelets
focal adhesion formation by, 490
integrin on, 497
protease nexin I and, 108-9
Poaceae
self-incompatibility in, 212
Podosomes, 510-12
Point mutations
simian virus 40 enhancer region and, 131-32
Poliovirus
VP4 protein of, 636
Pollen tubes
biosynthesis of, 222-23
Pollen tube walls
structure of, 220-23
Pollination, 220-24
Polymorphonuclear leukocytes
chemoattractant receptors of, 659
chemokinesis in, 658
chemotaxis in, 650-52
polymerization in chemoattractant-induced, 667
Polyoma virus
cis-linked gene expression in, 128
Porins
Escherichia coli
regulation of, 21-38
Primulaceae
heteromorphic genera in, 212
Procollagenases
plasmin and, 94, 109, 113
Progerialike syndrome
decorin and, 247
Prokaryotes
transcription control in, 127
Prostaglandins
focal adhesions and, 506
Protease nexin I
plasminogen activator and, 108-9
Proteases
growth cones and, 51-52
Protein folding
protein transport and, 273-81
Protein kinase C
activation of
receptors and, 422
β-adrenergic receptor and, 410
plasminogen activator gene transcription and, 98
rhodamine 123 and, 173
tumor promoters and, 507

Proteins
amide linkages and, 622-29
esterification and, 613-22
fatty acylation and, 611-37
growth control and, 633-35
mitochondrial import of, 312-20
myristylation and, 622-28
Protein synthesis
rhodamine 123 and, 161, 173
Proteoglycans, 229-48
cell adhesion and, 244-45
cell differentiation and, 245-47
cell surface, 239
chondroitin sulfate/dermatan sulfate group of, 233-35
expression of, 239-41
extracellular matrix assembly and, 242-43
glycosaminoglycan component of, 231-33
immunochemistry of, 238-39
secreted proteases and, 52
sequence and domain structure of, 235-38
structure of, 230
style mucilage, 223-24
Prothrombin
kringle-like structures in, 96
Prunus avium
S-gene products of, 216
Pseudopods
chemoattractant-induced F-actin in, 668
Pterines
chemotaxis and, 650
Purpurin
binding to heparin, 247
Pyrimidines
mitochondrial biosynthesis of, 290
Pyronine Y
anticancer activity of, 174

R

Ranunculus aeris
self-incompatibility in, 213
Rat brain proteolipid protein
amino acid sequence of, 614
Reptiles
basilar papillas of
organization of, 77
ears of
frequency selectivity of, 78
Retinoid binding protein, 632
Retinoids
plasminogen activator synthesis and, 98
Retroviruses
long terminal repeat regions in, 128-29
myristylation and, 622-25
Rheumatoid arthritis
immune system and, 101
Rhizobium leguminosarum
DctD regulatory proteins of, 30
Rhodamine 123
anticancer activity of, 173-74
mitochondrial membrane potential and, 157-61
Rhodopseudomonas sphaeroides
fatty acyl amides of, 628
Rhodopsin
coupling and regulation of, 421-23
phosphorylation of
rhodopsin kinase and, 416, 421-23
Rhodopsin kinase
rhodopsin phosphorylation and, 416, 421-23
Rhodopsin receptors
chemoattractant receptors and, 659
Ribophorins
protein translocation and, 262
Ribosomes
outer hair cells and, 83
RNA
export from nucleus, 349-51
import into mitochondria, 320
RNA polymerase
prokaryotic transcription of, 127
rhodamine 123 and, 173
RNA synthesis
rhodamine 123 and, 161
RNA transcription
nuclear matrix and, 144
Rosaceae
self-incompatibility in, 212
Rosette adhesions, 510-12
Rough endoplasmic reticulum
nuclear envelope and, 260-61
outer hair cells and, 83
Rous sarcoma virus
focal adhesions and, 508-12
myristylation and, 625
Rubiaceae
self-incompatibility in, 212

S

Saccharomyces cerevisiae
agglutination in, 444-46
cell fusion in, 446-48
cell type control in, 431-33
conjugation in, 429-52
cytochrome *c* isoforms of, 310
division arrest in, 441-44
mechanism of, 443
recovery from, 443-44
extracellular pheromones of, 436-38
gene expression in
pheromone induction of, 433
mating of, 450-52
mitochondrial biogenesis in
nuclear genes controlling, 305-7
mitochondrial DNA of, 291-98
differential gene expression of, 301-2
nuclear fusion in, 448-49
nuclear gene products of, 309
pheromone receptors of, 438-40
tubulin genes in, 702-4
zygote recovery in, 449-50
Salmonella typhimurium
ompB locus of, 24
Sarcoma viruses
myristylation and, 623
Schizosaccharomyces pombe
mitochondrial DNA of, 298
tubulin genes in, 702-4
Sea urchin
mitochondrial DNA of
transcription of, 302
Secale cereale
self-incompatibility in, 214
Self-incompatibility, 211-20
gametophytic, 212-14
heteromorphic, 212
homomorphic, 212-15
molecular genetics of, 217-20
sporophytic, 214-15
Semicircular canals
hair cells of, 66
Sensory cranial nerve ganglia
derivation of, 385
Sensory ganglia
derivation of, 383-85
Serglycin
amino acid sequence of, 235
Serotonin
growth cones and, 50
Severin
chemotaxis and, 667
Signal peptidase
protein translocation and, 262
Simian virus 40
protein-protein interactions in, 145
transcriptional start sites in, 128

Simian virus 40 enhancer
DNase hypersensitive region of
topoisomerase II recognition site on, 143
organization of, 131-33
Skeletal muscle
myotendinous junction of
focal adhesions and, 493
Skin
type VII collagen and, 567
Sodium dodecyl sulphate
plasminogen activator inhibitor 1 and, 106
Solanaceae
self-incompatibility in, 212
Somatostatin
adenylyl cyclase activity and, 417
Spectrin
epithelialization and, 466
α-Spectrin
growth cones and, 48
Sperm cells
chemotaxis in, 649-50
gossypol and, 166
plasminogen activator binding sites on, 102
Sphingolipids
intracellular transport of, 601-2
Sphingomyelin
biosynthesis of, 602
Spinal ganglia
derivation of, 383-84
Sporophytes
self-incompatibility in, 214-15
molecular genetics of, 217-18
Stereocilia
hair cells and, 64, 66-67
structure of, 67-70
Steroid hormones
plasminogen activator synthesis and, 98
Streptomycin
hair cell transduction channels and, 72
Stress fibers
focal adhesions and, 492-93
Stromelysin
extracellular matrix and, 109
Stromelysin genes
AP-1 binding sites on, 133
Style mucilage proteoglycans, 223-24
Synapses
growth cones and, 45
hair cells and, 85-86

T

Talin
calpain II and, 506-7
focal adhesions and, 491, 493, 500-5
Rous sarcoma virus and, 510
1-O-Tetradecanoylphorbol-13-acetate
focal adhesions and, 507-8
Tetrahymena spp.
mitochondrial DNA of, 291, 296
Thioesterification
enzymes catalyzing, 619-20
Thrombin
plasminogen activator antigen release and, 101
plasminogen activator inhibitor 1 and, 105
protease nexin I and, 108-9
Thrombolysis
plasmin and, 93
Thrombomodulin
cell recognition site of, 244
heparan sulfate and, 235
Thrombospondin
glycosaminoglycan binding sites of, 232
plasminogen activator and, 97
Thymocytes
chemotaxis in, 649-50
Thyrotropin
focal adhesions and, 506
Tight junctions
epithelialization and, 472-73
o-Toluidine blue
anticancer activity of, 174
Topoisomerase II
simian virus 40 enhancer and, 143
Toxoplasma gondii
rhodamine 123 uptake in host cells and, 167
Tradescantia paludosa
polyA + RNA of
pollen-specific cDNAs from, 211
Transcriptional enhancers, 127-47
discovery and definition of, 127-30
function of
models of, 141-46
modular organization of, 130-37
positive and negative regulation and, 137-40
Transducin
interactions with rhodopsin, 421-22
Transferrin receptor
acylation of, 620
bound fatty acids of, 618
heparan sulfate and, 235
Transforming growth factor alpha
receptor-binding regions in, 95
Transforming growth factor beta
focal adhesions and, 506
plasminogen activator activity and, 100
plasminogen activator inhibitor 1 and, 105-6
p-Trifluoromethoxyphenylhydrazone
mitochondrial membrane potential and, 159
Trifolium pratense
S-gene products of, 216
Triostin A
DNA and, 14-16
Trophectoderm
cell membrane domains in, 473-74
endocytic pathways in, 477-78
Trophectoderm epithelium
development of, 459-62
Tropomyosin
cuticular plate and, 70
growth cones and, 48
Trypanosoma brucei
mitochondrial gene expression in, 302
Trypanosomatids
mitochondrial DNA of, 298
RNA editing in, 302
Trypsin
protease nexin I and, 108
Tubulin
α
acetylation of, 706-7
tyrosination of, 704-6
β
phosphorylation of, 709
structure of, 689-90
synthesis in oocytes, 466-68
Tubulin genes
α, 697-700
β, 690-95
invertebrates and, 700-4
vertebrates and, 690-700
Tubulin isotypes, 687-710
β
function of, 696-97
Tulipa gesneriana
pollen tube walls of, 221-22
Tumor necrosis factor
plasminogen activator inhibitor 1 and, 105-6

plasminogen activator secretion and, 101
Tumor promoters
focal adhesions and, 507-8
Tyrosination
α tubulin and, 704-6
Tyrosine kinase
plasminogen activator gene transcription and, 98

U

Ultraviolet absorption
DNA structure and, 3
Urea
mitochondrial biosynthesis of, 290
plasminogen activator inhibitor 1 and, 106
Urokinase
focal adhesions and, 508-9
Uvomorulin
embryonic cell adhesion and, 470, 473

V

Valinomycin
mitochondrial membrane potential and, 159
Vasopressin receptors
desensitization of, 422
Verapamil
mitochondrial membrane potential and, 166
Vertebrates
neuronal pathfinding mechanisms of, 53
tubulin genes in, 690-700
Vesicular stomatitis virus G protein
acylation of, 635
bound fatty acids of, 618
cytoplasmic domain of, 269-70
folding of, 278-79
Vibrio cholerae
DNA-binding protein of, 35-36
Vinculin
calpain II and, 506-7
epithelialization and, 464-66
focal adhesions and, 491, 493, 500-5
phospholipase C and, 506
phosphotyrosine in, 509-10
plasminogen activator and, 110
Viruses
focal adhesions and, 508-12
See also specific virus
Visna virus
myristylation and, 625
Vitronectin
cell recognition site of, 244
fibronectin matrix assembly and, 200
focal adhesions and, 494-95
glycosaminoglycan binding sites of, 232
von Willebrand factor
cell recognition site of, 244
glycoproteins IIb/IIIa and, 497
platelet receptors for, 238

W

Wound healing
fibronectin and, 184, 187

X

Xenopus laevis
lamin species in, 356
mitochondrial DNA of, 297
transcription of, 302-3
neuromuscular junctions of, 494
nuclear rRNA precursor in, 300
X-ray crystallography
DNA structure and, 8-9
Xylosyltransferase
acceptors for, 233

Y

Yeast
tubulin genes in, 702-4

Z

Zea mays
polyA + RNA of
pollen-specific cDNAs from, 211
Zebrafish embryos
motor neurons of
growth cones of, 53-54